7 ACCELEROMETER WITH INCORPORATED CONDITIONER

7.1 Introduction

This chapter describes the installation of a chain having an accelerometer with an incorporated electronic conditioner (see Figure 7-1). It is relevant to the following type of accelerometer:

- CE 310

A complete description is presented for this accelerometer type.

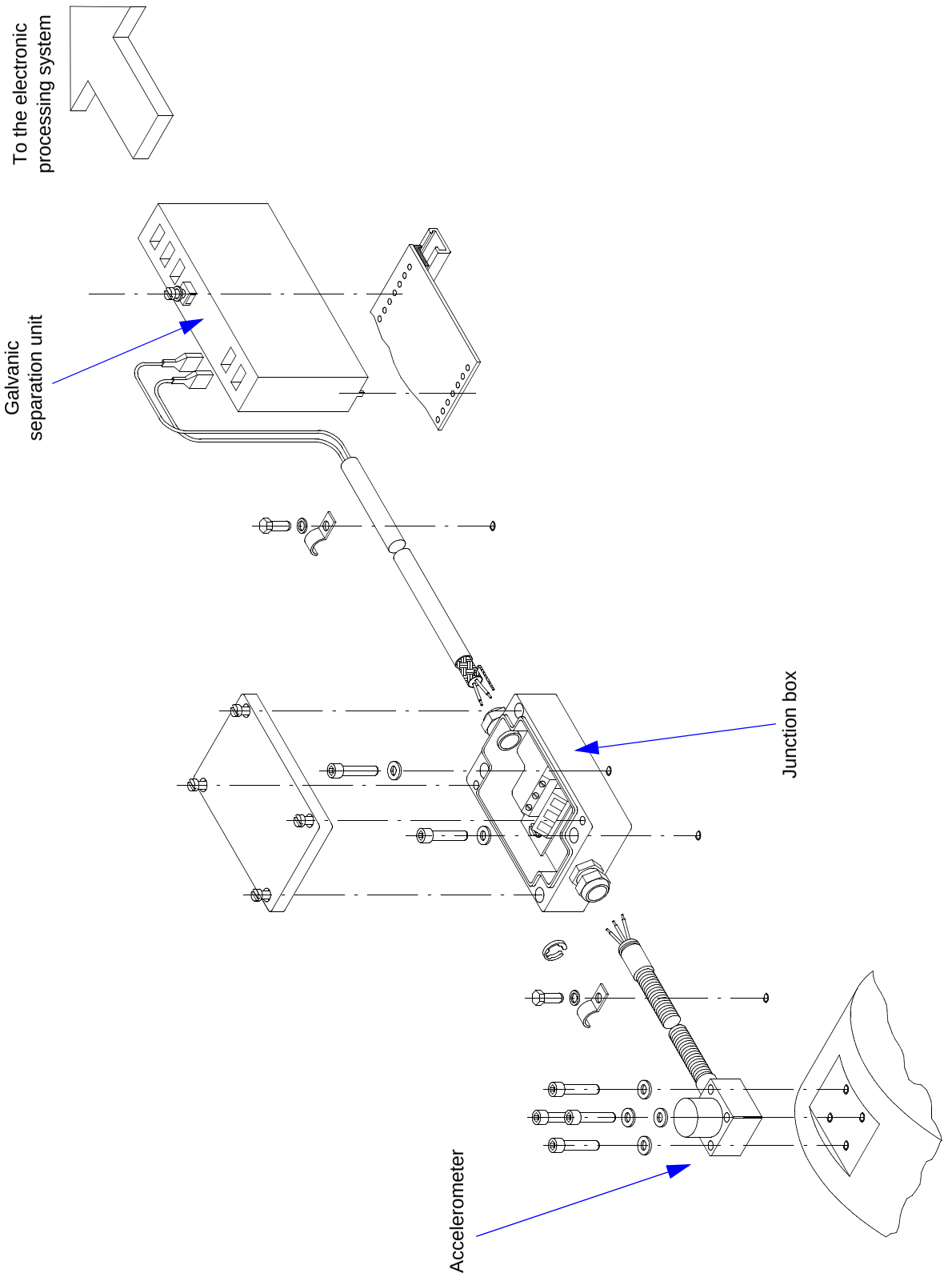


Figure 7-1: Mounting a chain having an accelerometer with incorporated electronic conditioner (example shows CE 310 accelerometer)

7.2 Mechanical Aspects

7.2.1 Mounting the Accelerometer

7.2.1.1 CE 310 Accelerometer

For the standard (non-Ex i) version of the CE 310, the temperature of the area where the accelerometer will be mounted must be between -30°C and +150°C.

For the Ex i version of the CE 310, the temperature must be between -30°C and +100°C.

NOTE : Respect the machining tolerances to eliminate the possibility of vibration signals being distorted due to deformations in the accelerometer base.

1) Prepare the part of the machine surface where the accelerometer will be mounted. This surface should be even and perpendicular to the desired sensitivity axis. The machined surface should have a surface evenness of 0.01 mm and a surface quality of N7 (see Figure 7-2).

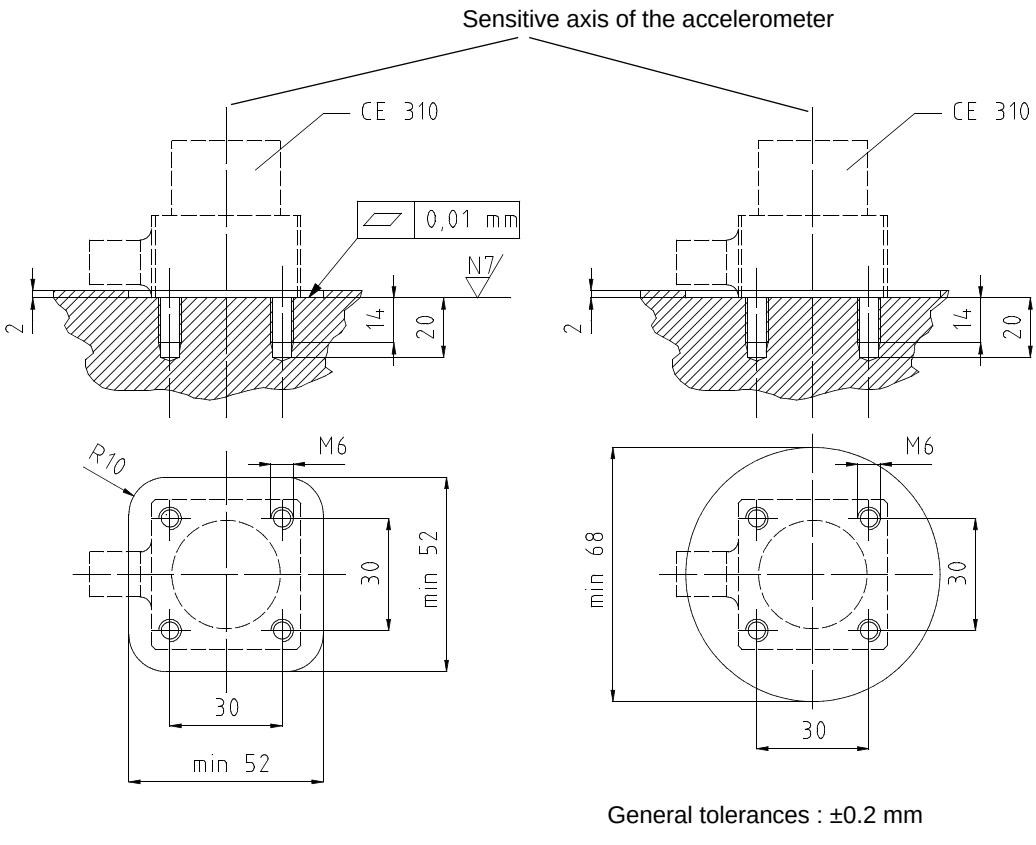


Figure 7-2: Machining the mounting surface

2) Mark the position of the four tappings (internal screw threads) on the machined surface.
3) Drill four holes with a diameter of 4.8 mm and a depth of 20 mm.
4) Apply M6 screw taps in the four holes to a depth of 14 mm.
5) Prepare four M6 x 35 hexagon socket head cap screws and four M6 single-coil spring lock washers.
6) Coat the screws with LOCTITE 241 adhesive.

NOTE : LOCTITE 241 adhesive can be used to secure elements that are susceptible to vibrations, in order to stop them becoming loose. These elements can nevertheless be disassembled at a later stage if this is necessary.

7) Position the accelerometer, equipped with washers and screws, on the mounting surface as shown in Figure 7-3.
8) Tighten the four screws using a torque wrench. Do not exceed a tightening torque of 15 Nm.

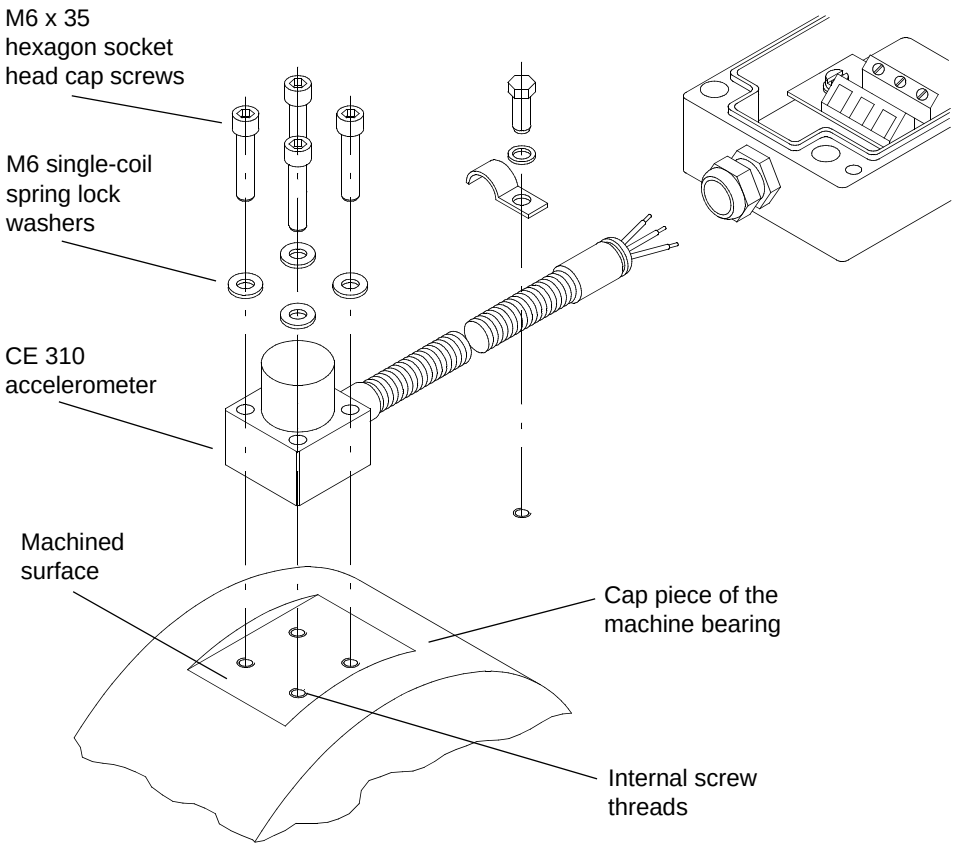


Figure 7-3: Mounting the CE 310 accelerometer on the machined surface

7.2.2 Fixing the Integral Cable

For the CE 310 accelerometer, the temperature of the area where the integral cable will be mounted must be between -30°C and +150°C.

Do not mount the cable near a high-voltage or high-frequency transmission line. The measurement signal can be degraded by interference if this is not respected.

1) Prepare an appropriate number of mounting clips intended for tubes with a diameter of about 8 mm. Prepare also the same number of fixing screws and washers.
2) Mark the position of the mounting clips every 100 to 200 mm on the machine.
3) Do not bend the cable beyond the minimum bending radius of 50 mm.
4) Drill and tap the holes for the fixing screws.
5) Coat the screws with LOCTITE 241 adhesive.
6) Position the mounting clips on the integral cable (see Figure 7-4).
7) Fix the screws by applying a tightening torque appropriate to the screw type used.

NOTE : Fixing the cable at regular intervals avoids interference due to the triboelectric effect. Relatively slow cable movements having a large amplitude can cause low-frequency noise to be added to the measurement signal.

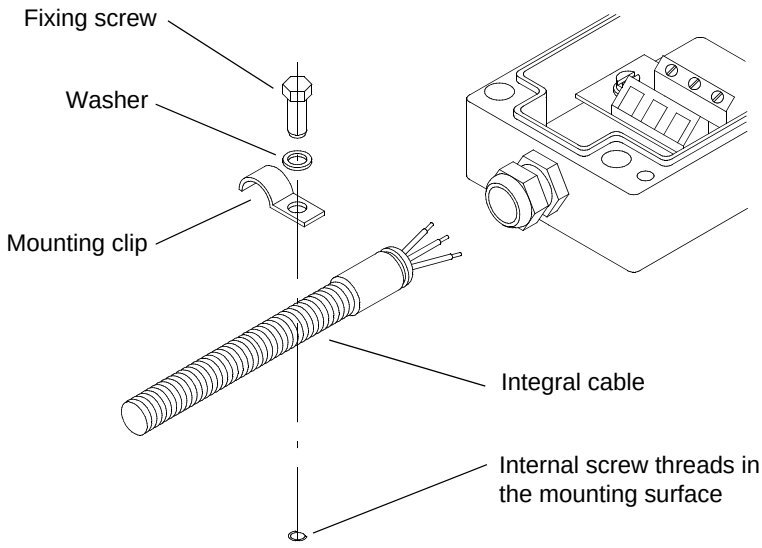


Figure 7-4: Fixing the cable

7.2.3 Mounting the Junction Box

Ensure that the temperature of the area where the junction box will be mounted lies in the range -20°C to +90°C.

1) Choose a vibration-free place for mounting the junction box.
2) Mark the position of the two tappings (internal screw threads) on the mounting surface. See example for a JB 105 junction box in Figure 7-5.

NOTE : If a different type of junction box is used, refer to the corresponding data sheet for information on mounting dimensions.

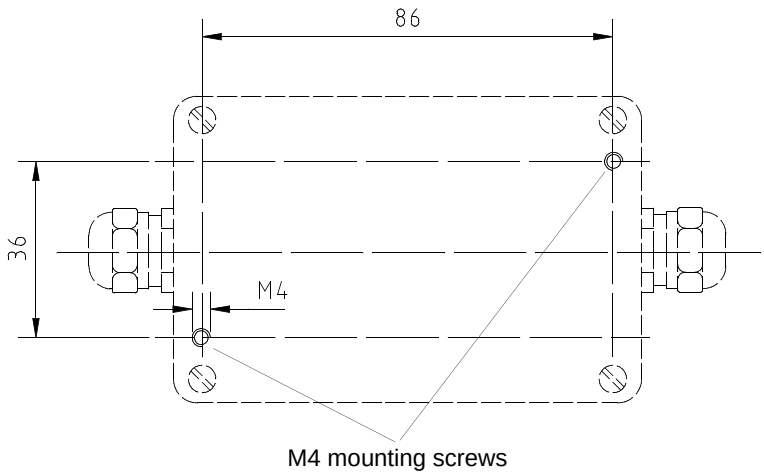


Figure 7-5: Example showing mounting dimensions for a JB 105 junction box

3) Drill two holes with a diameter of 3.2 mm and a depth of 14 mm.
4) Apply M4 screw taps in the two holes to a depth of 8 mm.
5) Remove the cover of the junction box by unscrewing its four screws (see Figure 7-6).
6) Position the junction box on the mounting surface and tighten the two M4 x 16 fixing screws. Apply a tightening torque appropriate to the screw type used.
7) Before closing the cover of the junction box, perform the electrical connections as described in 7.3 - Electrical Connections.
8) Place the cover on the junction box and tighten its four screws.

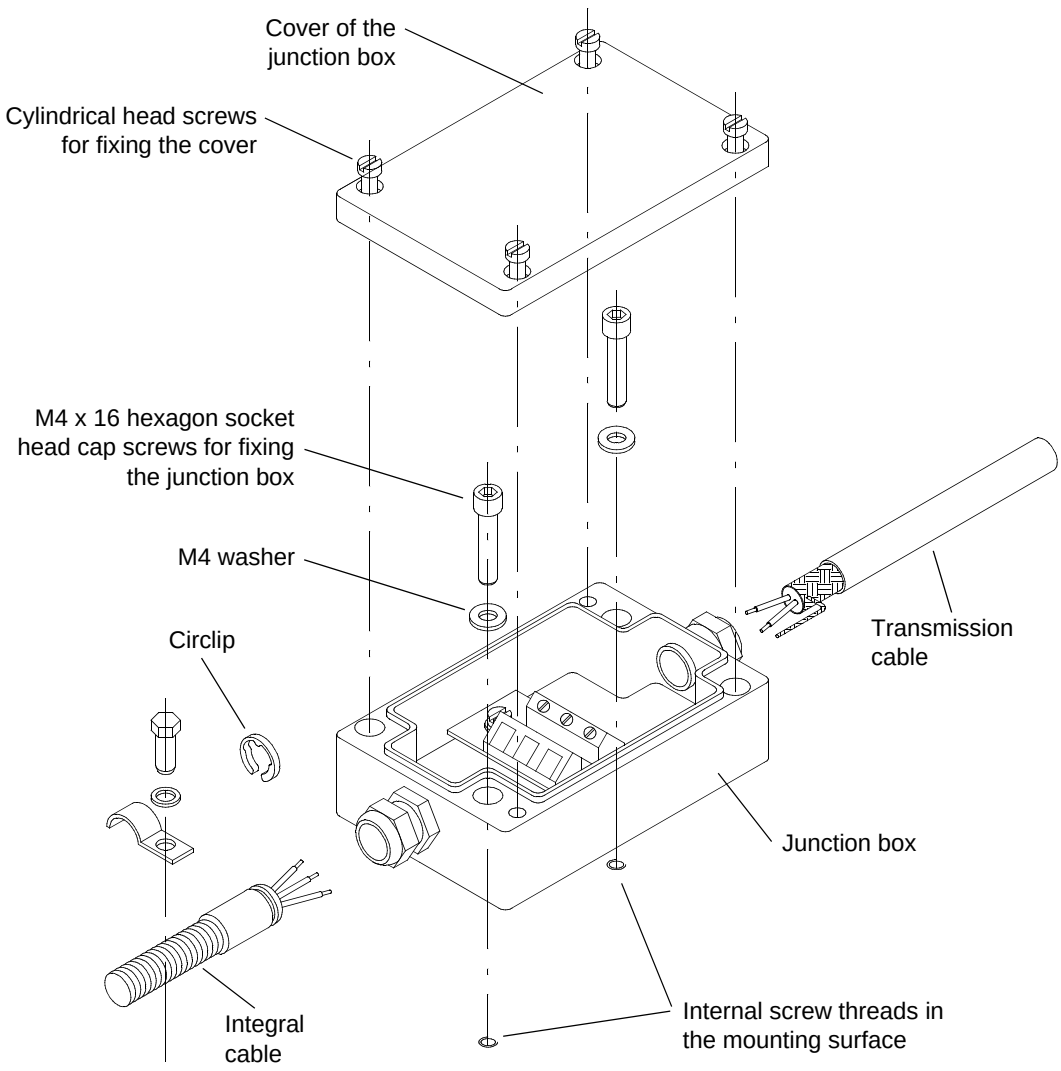


Figure 7-6: Mounting the junction box (example shows JB 105)

7.2.4 Fixing the Transmission Cable

Ensure that the temperature of the area where the transmission cable will be mounted lies in the range -10°C to +70°C.

This screened, 2-wire transmission cable can be mounted according to standards for low-voltage installations. It can be fixed by mounting clips as shown in Figure 7-7. Refer to 7.2.2 - Fixing the Integral Cable for further details.

Additional mechanical protection can be provided by placing the transmission cable in a conduit or galvanized steel flexible protection tube (e.g. KS 106).

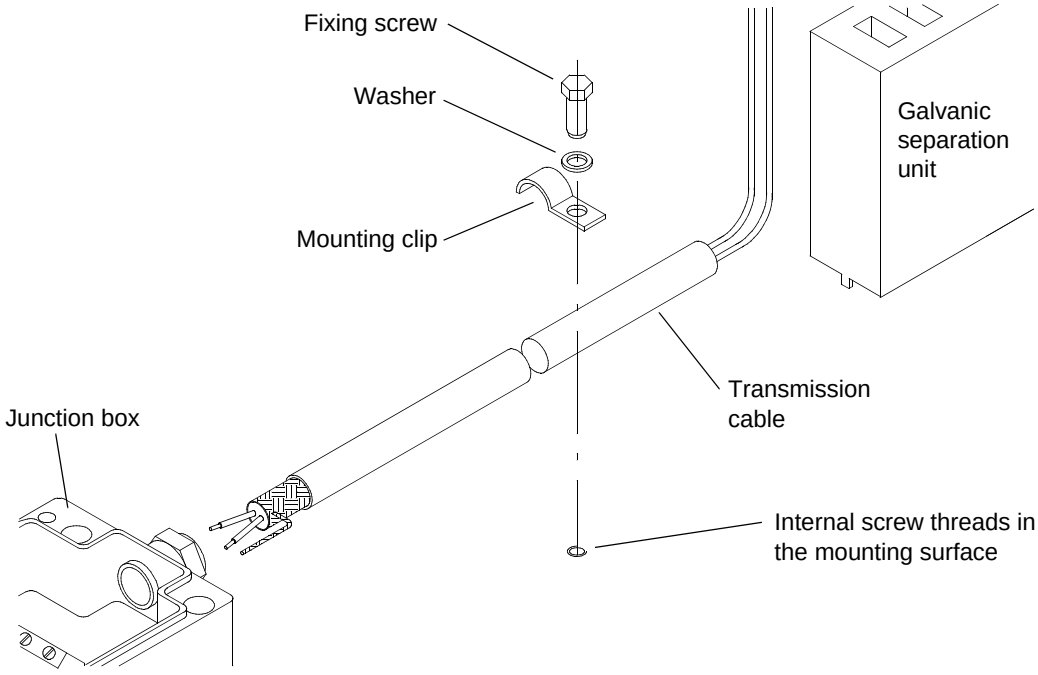


Figure 7-7: Fixing the transmission cable

7.2.5 Mounting the Galvanic Separation Unit

Ensure that the temperature of the area where the galvanic separation unit will be mounted lies in the range 0°C to +55°C.

The galvanic separation unit is generally mounted in an industrial housing, a rack or a cabinet.

A mounting assembly kit is available from Vibro-Meter. This consists of a bracket fixed on a DIN 46277/1 rail by means of an M4 fixing screw (see Figure 7-8). A positioning lug allows the correct placing of the galvanic separation unit on the bracket and, when there are several units, ensures the necessary spacing between them.

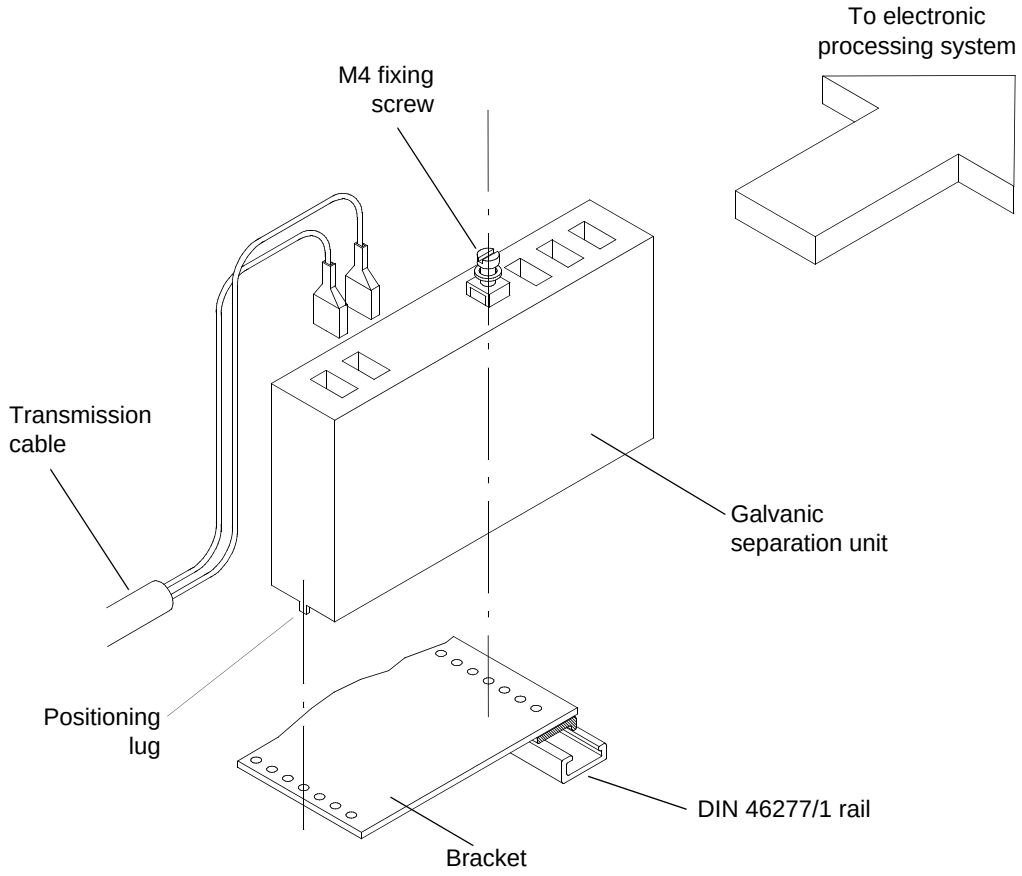


Figure 7-8: Fixing a galvanic separation unit using a mounting assembly

7.3 Electrical Connections

Refer to the general cabling diagram in Figure 7-10.

7.3.1 Connecting Cables to the Junction Box

1) Strip the insulation off the wires in the integral cable and the transmission cable (see Figure 7-9).
2) Remove the cover of the junction box by unscrewing the four screws.

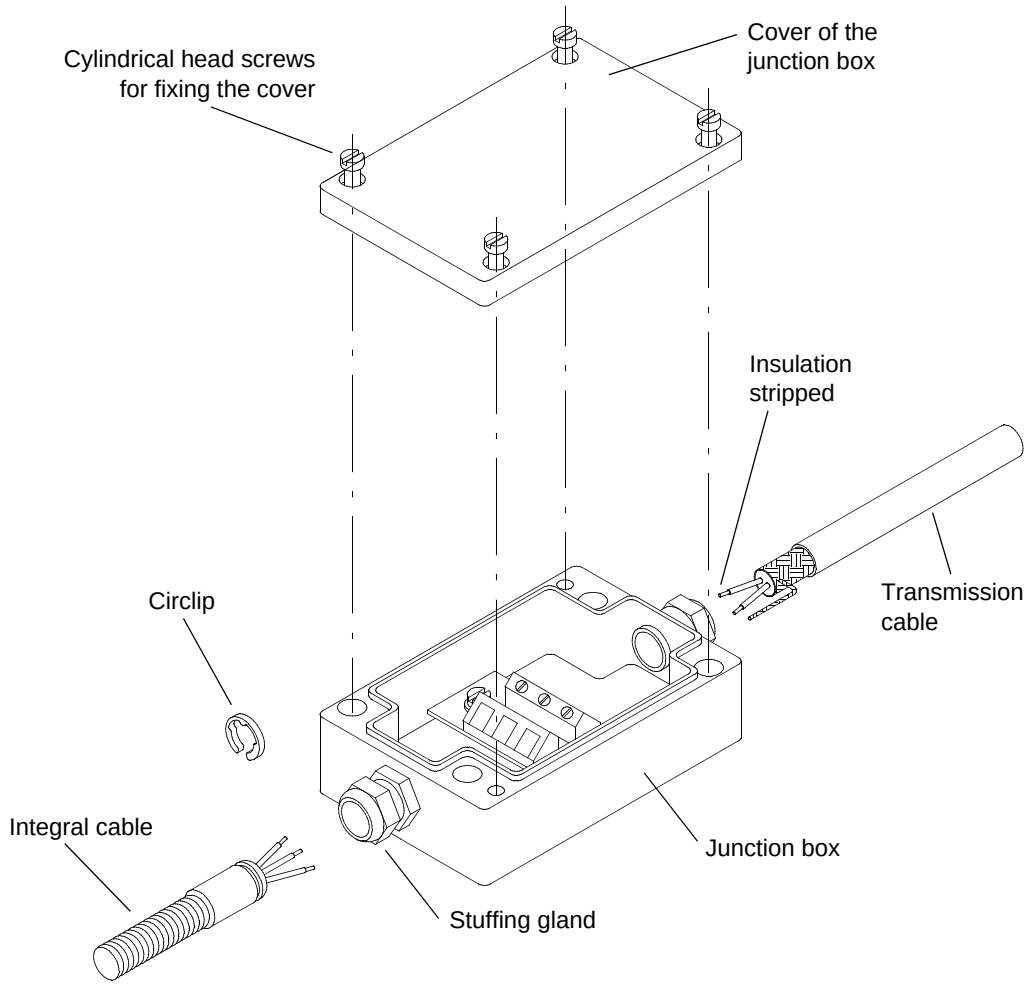


Figure 7-9: Connecting cables to the junction box

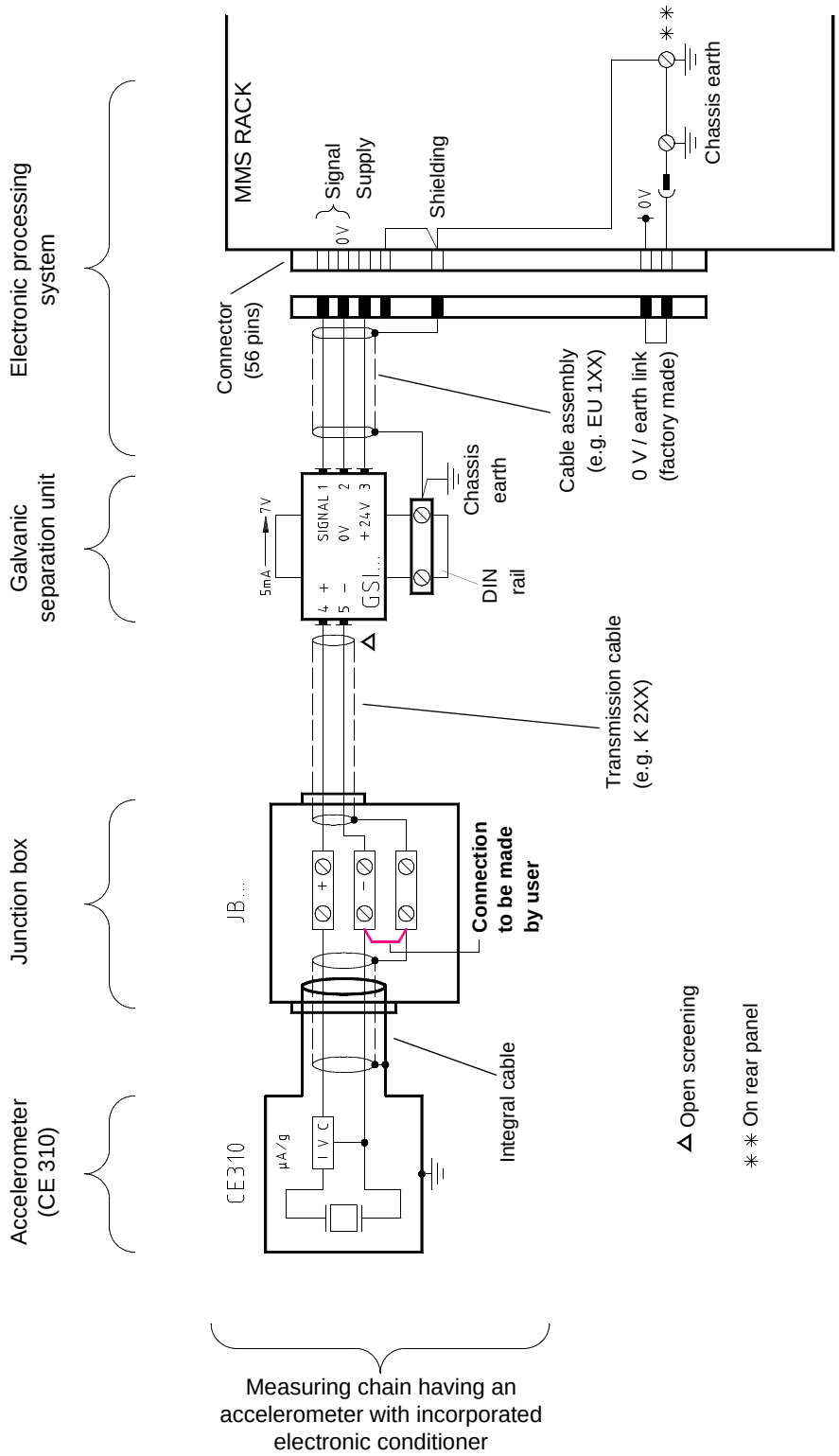


Figure 7-10: General cabling for an accelerometer with incorporated electronic conditioner

3) Obtain a short length of wire and connect it between the negative (-) and shielding terminals in the junction box (see Figure 7-10). This will ensure the vibration signals do not suffer any interference produced by leakage currents, earth loops, potential differences, etc. Such noise may be generated if the accelerometer is not earthed correctly (e.g. accelerometer mounted on an insulating support, mounting place not connected to earth, etc).

4) Pass the cables through the stuffing glands on the junction box. To do this, proceed as follows (see Figure 7-11) :

   a. Unscrew element 1 anti-clockwise. Do not remove element 5 from the housing.

   b. Pull elements 2 and 3 out of element 1 (elements 2 and 3 allow the stuffing gland to be adapted to different cable diameters). Element 2 can be removed from element 3 simply by pressing it outwards.

   c. Pass the cable through elements 1, 2 (if used), 3, 4 and 5.

   d. Assemble and tighten the elements of the stuffing gland.

   e. Check that the cable is held fast by the stuffing gland. This is necessary to guarantee the required waterproofness.

5) Connect the wires of the integral cable and the transmission cable to the terminal strips of the junction box (see Figure 7-9).

6) Place the Ø 8 circlip (supplied with the accelerometer) into the groove in the cable bushing (see Figure 7-9 and Figure 7-11). This prevents the integral cable from slipping out of the stuffing gland.

7) Place the cover on the junction box and tighten its four screws.

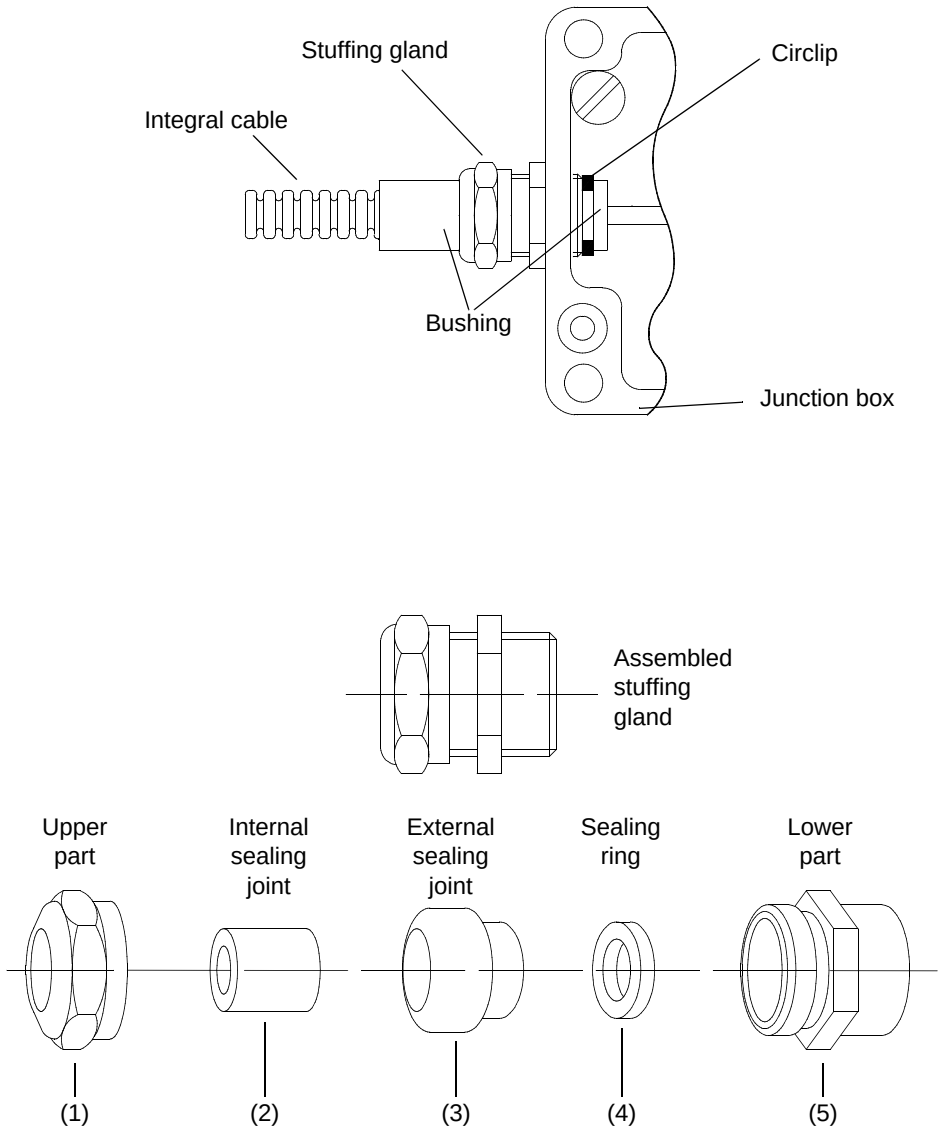


Figure 7-11: Stuffing gland mounted on a junction box (assembled and exploded views)

7.3.2 Connecting the Transmission Cable to the Galvanic Separation Unit

1) Strip the insulation off the leads in the transmission cable.
2) Crimp these leads to two AMP Faston 6.3 lugs.
3) Plug the lugs into the galvanic separation unit (see Figure 7-12).

NOTE 1 : The screening of the transmission cable should not be connected to the galvanic separation unit.

NOTE 2 : The leads of the cable linking the galvanic separation unit to the electronic processing system must also be equipped with AMP Faston 6.3 lugs.

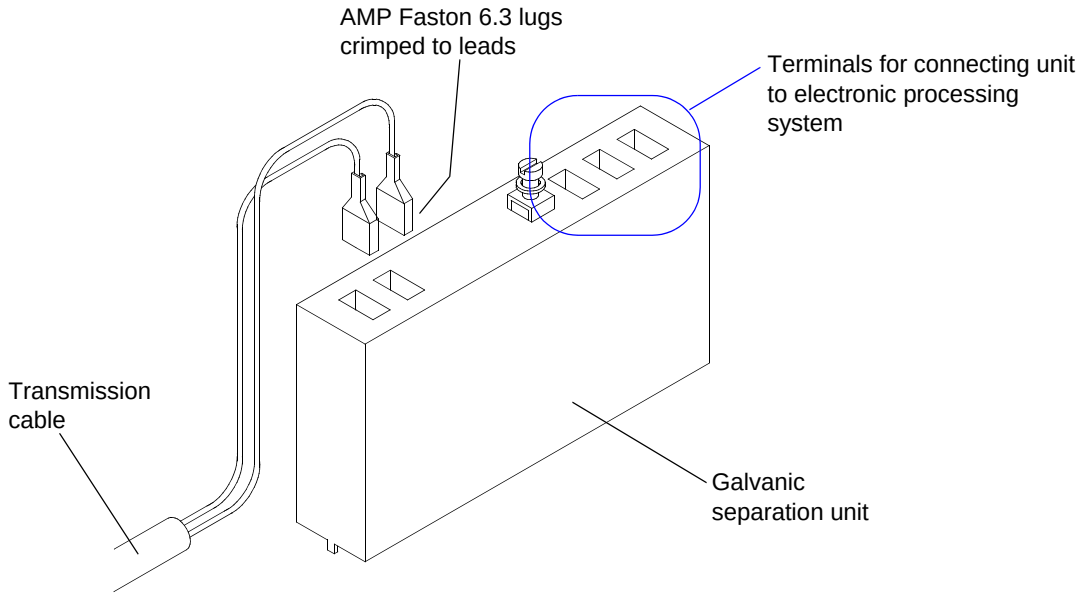


Figure 7-12: Connecting the transmission cable to the galvanic separation unit

8 MOUNTING ACCESSORIES

8.1 Introduction

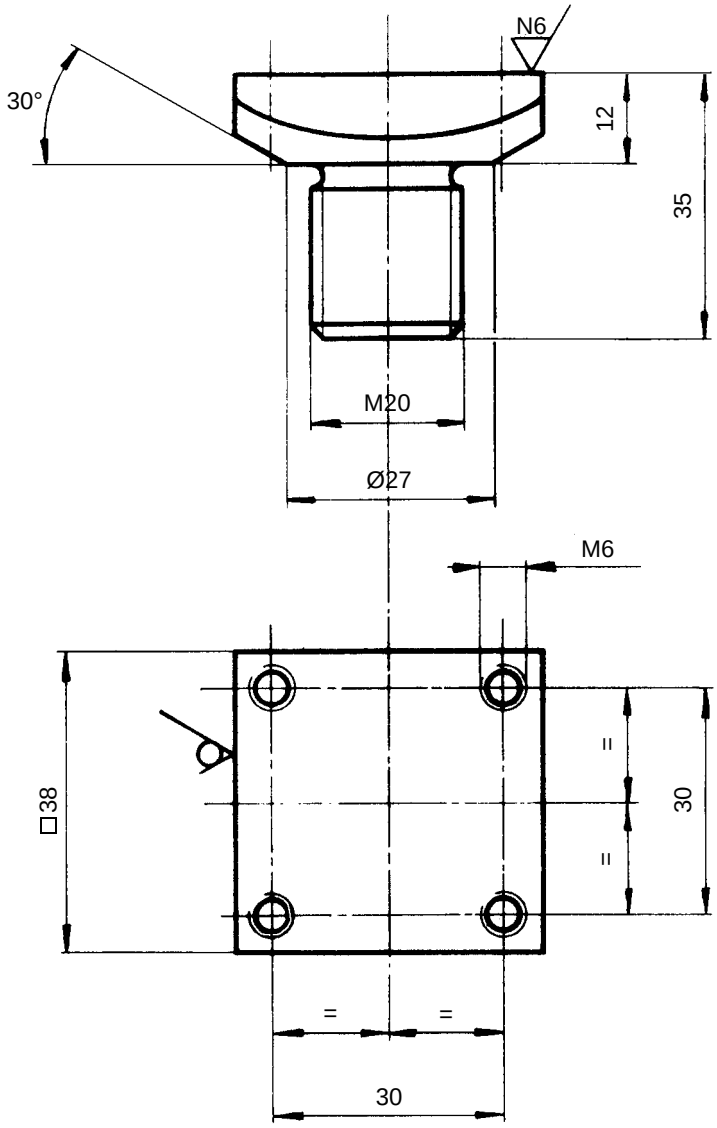
In certain applications the accelerometer cannot be mounted directly and a mounting accessory is required. This can be the case when :

1) Space is limited.
2) It is not possible to machine an even mounting surface.
3) It is necessary to electrically or thermally isolate the accelerometer.

This chapter describes the accessories available from Vibro-Meter.

8.2 Mounting Studs

Several types of stainless steel mounting studs (Figure 8-1 to Figure 8-3) are available to simplify the mounting of accelerometers on uneven surfaces. These studs enable high quality, rigid fixing of accelerometers without the need for special tools. Mechanical stress in the accelerometer due to uneven mounting is avoided, thereby increasing the reliability of the measured signal.

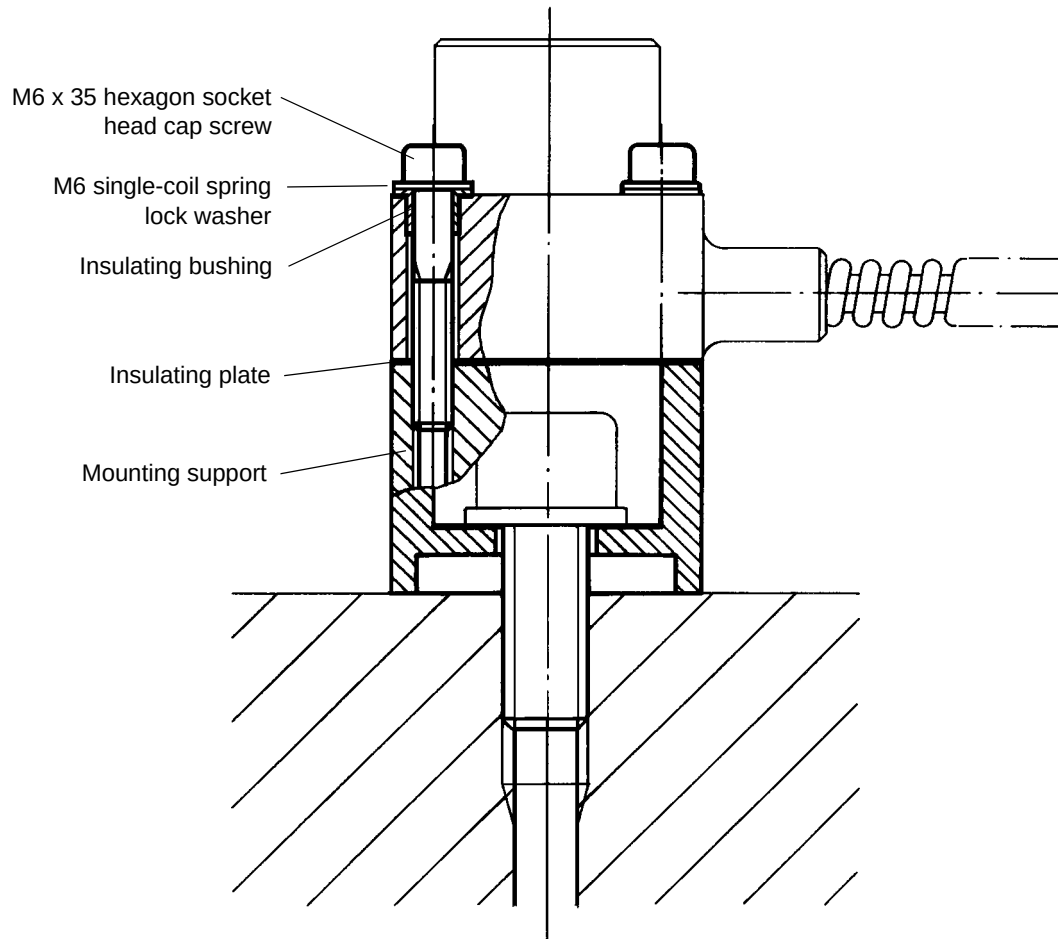


P/N 444-310-401-101

**Figure 8-1: TA 102 mounting stud
for CA 201 and CE 310 accelerometers**

8.3 Insulating Supports

8.3.1 Electrically Insulating Support



P/N 444-310-500-201

Figure 8-4: TA 101 electrically insulating support for CA 201 and CE 310 accelerometers